Alkene Additions — Answer Key

Ten carefully checked problems • Organic Chemistry • Instructor copy

INSTRUCTOR ANSWER KEY — Correct answers and explanations appear in red.

1. Give the major product of propene + HBr (no peroxide).

   Answer: 2-Bromopropane via Markovnikov ionic addition.

2. Give the major product of propene + HBr with suitable peroxide conditions.

   Answer: 1-Bromopropane via radical anti-Markovnikov addition.

3. Which reagent reduces propene to propane?

   Answer: H_2 with a suitable metal catalyst such as Pd.

4. How do you make 1-propanol from propene using hydroboration?

   Answer: 1. BH_3·THF; 2. H_2O_2, NaOH; anti-Markovnikov alcohol.

5. Is hydroboration syn or anti addition?

   Answer: Syn addition of H and B across the double bond.

6. What intermediate forms in bromination with Br_2?

   Answer: A three-membered bromonium ion.

7. What is the stereochemical tendency of Br_2 addition to cyclohexene?

   Answer: Anti addition gives trans-1,2-dibromocyclohexane (as a racemic pair).

8. What type of product forms from Br_2 in H_2O?

   Answer: A halohydrin; OH generally adds to the more substituted carbon.

9. Which is not generally subject to the peroxide effect: HBr or HCl?

   Answer: HCl; the favorable radical chain mechanism is distinctive for HBr.

10. What mechanistic issue may affect acid-catalyzed hydration?

    Answer: Carbocation rearrangements can alter the product skeleton.